A READER FOR AGRICULTURISTS

OLD AND YOUNG

THE STORY

OF

RAI SAHIB KALURAM KURMI OF PETGAON

BY

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Rai Sahib Kaluram Kurmi

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PREFACE.

The results of experimental work in India are opening up vistas of a new and golden age in Agriculture. They have revealed to the cultivator new and improved methods, and the Agricultural Colleges are turning out large numbers of men trained in the theory and practice of scientific farming who are carrying the glad tidings to the ryot in his own village.

Agriculture is the most important and the most honourable profession that a man can follow in India ; but this feeling unfortunately has not yet taken deep root in our midst. Literary professions still continue to attract the best brains of the country, and the development of this, our greatest industry, on which India's progress mainly depends is not receiving from the educated classes the attention which it deserves. This is due to some extent, perhaps, to the educational system in force—a system which is better suited for urban than for rural areas. The Farm Schools now being opened in many parts of India, and the greater attention being paid to the teaching of Nature Study in rural schools should go far to make our future farmers take a more intelligent interest in their life's work, and to attract to this noble profession the best brains of rural areas.

With this end in view the aim of this book is to idealize rural life : for if we give the sons of the soil a vision of something better than they have known in the past, their occupation at once becomes more attractive and more worthy of their attention. These higher ideals have been woven in the thread

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CHAPTER 1.

In the village of Petgaon in Nermad District my friend Rai Sahib Kaluram Kurmi, the Malguzar, was a most popular gentleman and a very progressive farmer who worked for the good of his tenants. In the improved methods of cultivation which he practised on his own land he was able to set them a worthy example which many of them followed as we shall learn later in this book.

His village was well-known in the Tahsil for its good cultivation and good management. When I first came to know him 12 years ago, he was himself cultivating 80 acres of land, of which 47 acres were under cotton, 10 under juar, 20 under wheat, 2 under sugar-cane and 1 under garden crops. In that part of the country juar grain was the chief food of the people; while juar stalks were the principal food or fodder given to cattle. After meeting the wants of his servants he generally had a good deal of juar grain for sale. Cotton was his chief money-giving crop. He used to sell all his lint and most of his cotton seed ; the remainder of his seed he fed to his cattle. He learned later, however, that it was much more profitable to feed oil-cakes to his animals and to sell all his cotton seed as seed for sowing. His wheat straw was used as a fodder and as bedding for his cattle. The grain he sold to his own tenants for seed purposes.

He grew thick and thin varieties of sugar-cane. Most of his thick varieties were sold in the bazar for chewing; because these varieties, being soft and juicy, are very sweet. He crushed all his other varieties and made the juice into *gur* for which there was a big demand in the local bazar.

His garden was one of the very best in the whole District, and he was able to sell a large quantity of chillies and vegetables every year. In addition to vegetables he had in it some well-kept flowering shrubs and a small area under orange, mango and guava trees.

When I first visited his village he had eight pairs of strong, well-fed bullocks of which he kept two pairs for working *mhotes*; for Rai Sahib Kaluram was noted in that part of the country for the excellent crops of irrigated wheat, cane and vegetables which he grew in a field commanded by a large well. He also kept three good cows and some young cattle.

He was well-known to the Commissioner of his Division and to the Deputy Commissioner of his District, and he was a member of the District Board and of the District and Tahsil Agricultural Associations. Each Tashil Agricultural Association consisted of from 40 to 50 of the leading land-owners of the Tahsil, while the District Association consisted of selected members of the different Tashil Associations of the District. As a member of his Tahsil Association, he had undertaken to try in his village the improved methods of cultivation recommended by the Department of Agriculture. He was always anxious to learn new and better ways of doing things, and had adopted and was carrying out several improved methods of cultivation with the assistance and advice of the Divisional Superintendent of Agriculture.

Rai Sahib Kaluram never missed an opportunity of

attending the Divisional Agricultural Show and Conference held every year on the Sakola Experimental Farm. He had won a silver cup for a fine sample of cotton exhibited by him at one of these shows, and had got several money prizes for other crops.

Being considered a leading light in Agriculture, he was always one of the principal speakers at these Agricultural Conferences. In the papers which he read, and in the speeches which he made, his object always was to explain to his fellow-cultivators at these meetings the great benefit of adopting agricultural improvements. He used to appeal to all of them to follow his example and generously offered to help them in doing so.

CHAPTER 2.

As the Divisional Agricultural Show and Conference were always held on the Sakola Experimental Farm of the Division, Rai Sahib Kaluram made a point of living on the Farm for three or four days every year at this time. This gave him an opportunity of learning what was being done thereon. On such occasions he spent much time in examining the numerous experiments being carried out, and had many questions to ask the Farm Superintendent regarding the different varieties of each crop grown, the different kinds of manures and implements used, and the results obtained from their use. He was of an enquiring mind and never lost the chance of learning all he could regarding the new and more profitable methods of agriculture which were being carried out.

He came to know the Farm so well that on the day

of the Show it was his custom to bring cultivators from Petgaon and all neighbouring villages with him. To these he explained everything regarding the crops being grown and the manures and implements being used on the Farm.

He was particularly interested in the different varieties of cotton, juar and groundnut which he saw growing. He had often wondered how it was that the cotton which he grew in Petgaon varied so much from plant to plant in the colour of the flower, the shape of the leaf, and other characteristics. He now came to know for the first time that the cotton which he grew was a mixture of different varieties, the flowers of which differed in colour, and the leaves of which varied in shape. Some varieties in the mixture gave much more lint than others; and some gave lint of good quality, while the lint of others was much poorer.

He found that all the varieties in this mixture had been carefully selected and that each variety was sown in a separate plot on the Farm. In each of these plots a few of the best plants had been labelled and the *kapas* of each was being collected in a separate bag. He was told by the Superintendent that the seed of each of these selected plants would be sown in lines, and that the seed of all the best plants in each line would be kept for sowing in a separate plot the following year. The same method of selection was, he found, being carried out in the case of juar.

The juars grown on the Farm were divided into three groups, namely (i) late varieties suitable for heavy soils which retain moisture late in the season, (ii) early varieties suitable for light soils, and (iii) medium-early varieties suitable for soils of medium quality.

Before leaving the Farm he requested the Superintendent to send him selected seeds of his best varieties of cotton,

groundnut and juar which he said he would grow in his own fields in Petgaon, so as to be able to supply his tenants with good seed.

He was much interested, too, in the improved implements which he saw at work and spent hours in learning how to adjust and work them.

CHAPTER 3.

When next he visited this Government Farm he brought the Superintendent the welcome news that the cotton which he had got from him the previous year had given an outturn of 15 seers of lint per acre more than the *deshi* cotton which he had been accustomed to grow. The new varieties of juar which the Superintendent had given him, had also done well.

Of the new varieties of groundnut he liked Small Japanese best, because when sown about the middle of June it was ready for harvesting early in October, before the time for sowing wheat. He had sown wheat in the field immediately after harvesting this variety. In this way he was able to raise two crops in one year.

After getting this improved variety of cotton from the Government Farm he became very enthusiastic in the cultivation of that crop; because the cotton supplied by the *Sarkar* was much more profitable than the mixed cotton which he had formerly grown. This was largely due to the fact that it gave a much higher percentage of lint on being ginned. He also found that it possessed many other good qualities; for the staple was long and strong and the lint was clean and of good colour. Rai Sahib Kaluram used to claim that when other villagers, who grew mixed cotton,

got a 12 anna crop, the *Sarkari* cotton grown by himself and his tenants in Petgaon gave a 16 anna yield.

When he marketed his lint he got Rs. 10 more per *boja* of 196 seers or Rs. 20 more per khandi of 392 seers than other cotton-growers who did not grow the improved *Sarkari* variety. The fame of this cotton spread in neighbouring villages and the demand for it was great.

Picking *Sarkari* Cotton.

To these villages Rai Sahib Kaluram had not been able to supply much seed, as most of the quantity produced by him was required by his tenants in Petgaon. He, therefore, decided to start a Co-operative Seed Union for the production of more seed of this desirable variety.

Four of his most enterprising tenants in Petgaon agreed to start sēed farms, while four cultivators and five Malguzars

of three neighbouring villages consented to join them by opening seed farms in their respective villages. The rules for the formation of this Co-operative Seed Union were drawn up by the Assistant Director of Agriculture and the Registrar of Co-operative Credit Societies. According to the rules the Union was to be run by a President, two Supervisors and a Secretary. Durga Prashad of Malkapur and Shaikh Mohammed of Alipore were appointed as Supervisors. Govind Prashad of Petgaon became Secretary and Rai Sahib Kaluram himself President of the Union. They appointed a *Kamdar* on Rs. 15 a month to look after the ginning of the cotton and its distribution later. One of the duties of this *Kamdar* was to visit all the seed farms of the Union when the cotton was in flower and to uproot alien plants.

To Rai Sahib Kaluram's Seed Farm, which was called the Central Farm of the Union, pure seed was supplied every year from the Government Farm. The seed was multiplied on the Central Farm and distributed to the other Farms of the Union which were known as the Branch Farms. The District Agricultural Assistant paid frequent visits to these Farms and gave special attention to the weeding out of any mixture in the cotton of the Central Farm.

In order to keep the seed pure, the owners of all the Seed Farms were obliged, according to the rules, to sow *Sarkari* cotton only, because it had been found that when any one cultivator grew mixed cotton and pure cotton on the same farm there was a great risk of the pure cotton getting mixed. All the cotton of the Union was ginned on a ginning plant consisting of a small oil engine of 10 B. H. P. and 3 Platt Brothers' Gins belonging to Rai Sahib Kaluram. For the purchase of the gins and engine he had taken a loan of Rs. 2,000 from Government.

As a supply of pure seed was obtained every year from the Government Farm, and as all the *kapas* of the different seed farms was ginned by itself, the seed supplied by the Union every year to cultivators in the neighbourhood was very pure.

For the first year or two, the *Sarkari* cotton of the Central Seed Farm and of the Branch Seed Farms of the Union was found to contain a small mixture of plants of ordinary *deshi* cotton. The seed of mixed *deshi* cotton found its way into the fields of the Seed Farms of the Union in two different ways. Some of it was self-sown from the *deshi* crop which had been grown in the field the previous year, and some of it came with the cattle-dung. It is a well-known fact that when cattle are fed on cotton seed, some of that seed which is not properly chewed passes through the animal with its dung. Such seed germinates in due course in the field to which that dung is applied.

CHAPTER 4.

Rai Sahib Kaluram was able to supply from his Central Seed Farm all the seed required for the sowing of 13 Branch Seed Farms. He had increased the area of his Seed Farm to 45 acres which yielded every year about 9000 lbs. of seed. This was more than sufficient to sow 600 acres which were under Branch Seed Farms. From these 600 acres the annual outturn of seed was about 120,000 lbs., all of which was purchased by cultivators and sown in the neighbourhood of the Union.

The success of this Union was so great that within three years six Co-operative Seed Unions, each consisting of 10 or more members, had been opened in the Nermad District.

Some of these Unions not only produced seed but kept improved implements, oil-cakes and copper-sulphate for sale. He got all the members of the Petgaon Union to purchase til, cotton and linseed cake for their cattle as these food-stuffs were cheaper than cotton seed which they had been accustomed to use.

The Petgaon Union employed their own *Kamdar* in the slack season in demonstrating the use of improved ploughs, of copper-sulphate and of oil-cakes stocked at the Depôt of the Union.

Rai Sahib Kaluram tried to popularise the use of copper-sulphate as a fungicide, too, because when inspecting the Sakola Farm he had observed that all juar grown thereon was free of smut as the result of the seed having been steeped in a solution of copper-sulphate before sowing. He was told by the Superintendent that the spores or seeds of this disease are to be found in large numbers on juar grain. Even grain which appears to be quite free of these spores may have many of them adhering to it, because the spores are so small that they cannot be seen with the naked eye. Though we cannot see them we can kill them by merely steeping the seed in a solution of copper-sulphate which is a deadly poison for spores of this kind.

The Superintendent was good enough to show him the whole process of treatment. Two tolas of copper-sulphate were put into an earthen vessel containing 100 tolas of water and stirred till it was all dissolved in the water. He then poured juar seed into the vessel and stirred it round. In ten minutes the seed was removed and dried in the sun.

The cost of treating juar seed in this way in order to protect the crop against an attack of smut was found to be very small. Two tolas of copper-sulphate was enough

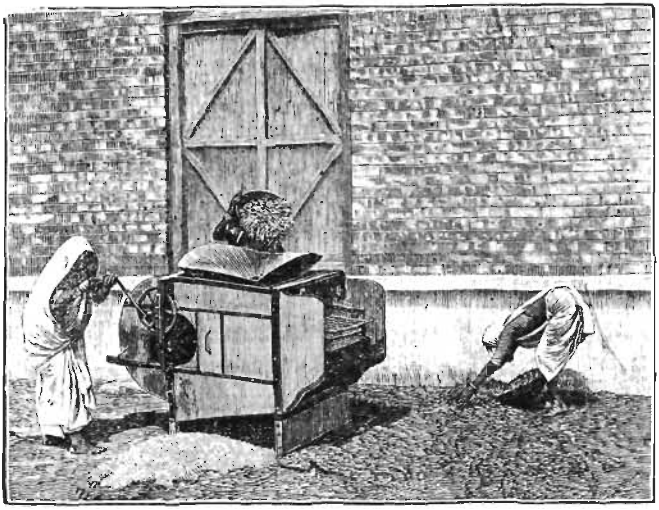
to steep seed for one acre of juar, and cost only about three pies. Rai Sahib Kaluram supplied all his tenants in Petgaon with copper-sulphate free of cost the following year, and not a single ear of juar suffered from smut in Petgaon that year. A great demand for copper-sulphate arose, for many cultivators from neighbouring villages had seen the wonderful effect the treatment had had on the Petgaon crop.

In order to popularise this method of treating juar seed to prevent smut, the Co-operative Seed Unions in Nermad, arranged to stock copper-sulphate for sale. They sold it in small packets costing one anna each. Each packet contained sufficient copper-sulphate for treating enough seed to sow 4 acres. Thousands of cultivators came to the Unions at sowing time to purchase packets of what they called "*smut medicine.*" This disease after three or four years almost disappeared in the District, as nearly every cultivator made a practice of steeping his seed before sowing it, thereby killing any spores which adhered to it.

To cover the expenses of the Petgaon Union the members were asked to pay from two to four annas per acre of cotton grown. This was called the Union Fund. It was sufficient to meet all their working expenses, including the *Kamdar's* pay, as well as the cost of the writing material and registers used.

The Petgaon Co-operative Cotton Seed Union was so successful that Rai Sahib Kaluram decided to start a Union for the production and distribution of wheat on the same lines. During a visit to the Elabad Experimental Farm he had seen the improved varieties of wheat under trial there, and he had been told by the Superintendent that wheat No. 10 would, if irrigated, do very well on the black soil of Petgaon. He purchased 100 seers of seed and sowed it on the land which he had previously cropped with Small Japanese

groundnut. From the area sown he harvested a 1000 seers of this wheat. He was so satisfied with the outturn that he started a Seed Farm for the multiplication of No. 10 wheat the following season. Needless to say the fame of this wheat, like that of the *Sarkari* cotton which he had obtained from the Sakola Farm, soon spread abroad. The demand for this selected variety was so great that he found it necessary to form a Co-operative Wheat Seed Union which included members from Petgaon and two other villages.



A Winnower at Work.

In the year 1906 wheat was much damaged by a heavy fall of rain in April. The grain was still on the threshing floor at that time as the cultivators were waiting for a suitable wind to enable them to winnow it. Rai Sahib Kaluram and many other land-holders suffered much damage that year, for not only was the colour of the wheat spoiled

owing to its getting wet, but much of it failed to germinate the following season. The cultivators suffered grievously in consequence. Rai Sahib Kaluram calculated that he alone suffered in that season a loss of Rs. 150 owing to his wheat being damaged in this way.

Before the harvest of 1907 he decided to purchase a winnower from the Elabad Farm. This winnower which cost Rs. 140 proved to be of great use to the members of the Co-operative Wheat Seed Union for Rai Sahib Kaluram allowed them all to use it. Instead of leaving their grain on the threshing floor until such time as they obtained a favourable wind, they cleaned it by means of the winnower and stored it without delay.

Rai Sahib Kaluram took a delight in telling his friends that he no longer relied on the wind which had proved to be a very untrustworthy servant. His winnowing machine was, he said, always ready to make wind whenever he needed it for cleaning his grain.

On his advice many cultivators of neighbouring villages purchased winnowers for themselves. With these they were able to clean their grain in a few days, instead of allowing it to lie for weeks on the threshing floor as they had had to do in former days.

CHAPTER 5.

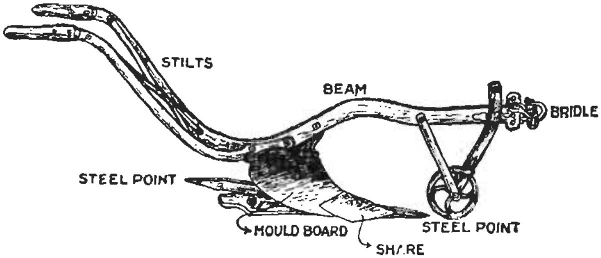
In the year 1907 the rainfall was much below expectation and crops suffered. Juar more especially did badly that season and the outturn both of grain and *karbi* was poor. Owing to great scarcity of fodder that season many cultivators had to buy *karbi*. Rai Sahib Kaluram foreseeing this, had purchased a fodder-cutter from the Sakola Farm. By means

of it he cut all his *karbi* into small pieces before giving it to his cattle. This he found resulted in a great saving of fodder as his cattle ate all the *karbi* when cut for them in this way; whereas they left about ¼th of it uneaten when it was fed to them whole.

In Petgaon a considerable part of the fields which were cropped with cotton and juar had got infested in places with "*dub*" and "*kunda*" grass. These persistent weeds choked the growth of crops every year and added greatly to the owners' labour bill for weeding. Part of the wheat area was overrun with another troublesome weed known as *kans* which is also a kind of grass. Some fields were so badly infested with it that they had been allowed to go out of cultivation altogether. Rai Sahib Kaluram made a point of visiting the Sakola and Elabad Farms at the time his fields were being ploughed, in order to see for himself how the Superintendents managed to keep the land of these Government Farms so clean.

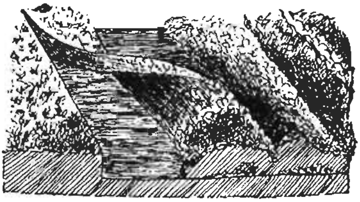
He observed that on the Sakola Farm where the heavy black cotton soil consisted of a clayey loam the Turnwrest and the Sabul ploughs were being used; while on the Elabad Farm where wheat was the principal crop, a lighter implement called the Monsoon plough was being worked. The Turnwrest plough, being heavy, worked well in the black soil, despite the fact that ploughing was not commenced till January when the soil was hard and dry. The Sabul plough did good work, too, especially when used before the soil had become very dry; but the Monsoon plough was much too light an implement for this tract. The Sabul plough was, he found, fitted with a share having a bar point sharpened at both ends. This point could, when necessary, be changed end for end.

He decided to purchase one of each kind so as to be able to plough his land at any season, and from that year henceforth his fields were the cleanest in the village. He used his Monsoon and sometimes his Sabul plough during breaks in the rains when the soil was moist; he used the Turnwrest and the Sabul in the dry weather.



A Sabul plough.

Now let us see how it was that he could, with the help of these improved ploughs, clean all the weeds out of his fields. If you will examine the furrow slices turned by ploughs of this kind you will understand how it was done.



Furrow turned by an improved plough.

The furrow is inverted by these improved ploughs and the roots of weeds are thereby left exposed to the sun, and die for want of moisture. The *deshi* plough on the other hand merely stirs the soil, but the weeds are left growing, as their roots are neither cut nor brought to the surface.

Rai Sahib Kaluram found that with the improved ploughs he could cultivate his land faster and more thoroughly. By ploughing deeper and turning up the lower layers of the soil to the air, the myriads of little soil-bacteria which prepare food for crops were able to do their work better, because the soil was more freely aerated as we say.

After two or three years' experience the advantages to be gained by using these improved implements became so obvious that he got the two Co-operative Seed Unions with which he was connected to stock them for sale and hire. Other Unions followed the example of the Petgaon Unions and are now adding to their funds every year by selling and hiring, not only ploughs, but also winnowers and fodder-cutters.

The work of these Co-operative Seed Unions increased so much that on the recommendation of Rai Sahib Kaluram the Director of Agriculture agreed to post one Agricultural Assistant to each Tahsil in Nermad District. These trained assistants devoted much of their time to the work being done by the members of the Tahsil Agricultural Associations and of the various Co-operative Seed Unions.

CHAPTER 6.

All the leading members of the Co-operative Seed Unions of the District were also members of the Tahsil Agricultural Association of the Tahsil in which they lived. Of this Association the Tahsildar was President. The members met twice a year, as a rule. The Assistant Director of Agriculture acted as adviser to these Associations, and the Divisional Superintendent attended their meetings, arranged for the subjects to be discussed there, and for the work to be done

by each member for the improvement of Agriculture in his own village.

The leading members of each Tahsil Association were members also of the District Agricultural Association which met once a year under the presidentship of the Deputy Commissioner. From these again certain members were selected for the Divisional Committee which met every year at the time of the Divisional Agricultural Show and Conference, under the presidentship of the Commissioner of the Division. The duty of this Committee was to discuss the progress made by the various Unions and Agricultural Associations and to decide on the work to be done in the following year.

At one of these meetings Rai Sahib Kaluram had pointed out that the Department of Agriculture had, as the result of much patient experimental work, discovered improved methods of cultivation, but that the cultivators were not deriving so much benefit from these discoveries, as they should. This he said was mainly due to (1) their poverty, and (2) to want of co-operation in the villages. He wanted to see more Co-operative Agricultural Unions and more Co-operative Credit Societies opened in every Tahsil. Government should also give loans to cultivators to enable them to purchase selected strains of seed as well as manures and implements approved by the Department of Agriculture. Being a man of ripe experience and of influence with the Commissioner his proposals were accepted.

At one of these Conferences the Commissioner presented Rai Sahib Kaluram with a *Sanad* which certified that he was a progressive land-owner who had done much to develop Agriculture in his District. A year later he was given a Silver Medal, and two years after that again a Gold Medal for the valuable assistance he had continued to give

the Department of Agriculture in fostering agricultural improvements among the people. In the same year in which he got his Gold Medal he was given the title of Rai Sahib.

CHAPTER 7.

Petgaon Primary School was the model school of the District. Rai Sahib Kaluram was a firm believer in primary education for all. Being the leading member of the School Committee he insisted on admitting to this village school boys of even the lowest castes, for he held that if their minds were trained so as to fit them for their duties in after life, there was no reason why the very poorest of them should not grow up to be good and useful citizens.

He approved strongly of making education as practical as possible, so as to fit the boys for their work in life. The opening of the Petgaon school garden by the orders of the Deputy Inspector was a real joy to him, for he saw in it the means of making the teaching more practical. He was confident that the boys' training in this garden would give them an interest in agricultural subjects.

The teacher fortunately had taken the full Nature Study Course at the Normal School, and was much interested in school gardening. The aim of his teaching was to train each boy to observe carefully and to reason correctly from the observations which he made; to train the hand and eye by using them in doing things; and to foster an outdoor interest in the things of Nature.

He was very successful as a teacher, because by bringing the boys into contact with actual things, and by giving them work to do with their own hands the teaching was made interesting for them. Visitors to the school always noticed

that the children were cheerful and happy, because of the real interest which they took in their lessons ; and that they were much brighter and more intelligent than the boys of other village schools.

In the school garden the boys had their own plots which they cultivated with their own hands, and in which they raised flowers and vegetables as well as plants of the staple crops of the District. The responsibility of having to do things with their own hands made them practical, resourceful and self-reliant. In carrying out the practical operations in the presence of the teacher and their class-fellows the boys were taught the dignity of labour. They got a useful training, too, in the use of tools ; they learned by doing things.

The teacher sometimes took his boys for excursions into the fields to study Nature on a larger and more varied scale there. On such occasions collections of plants, rocks, soils and other things were made for the School Museum. On these occasions interesting "finds" were sometimes made, the study of which was of great interest to the boys. One day for example, a boy found on a castor leaf, a cluster of things resembling very small beads. The teacher could have told them what these were but did not do so, as he wished hem to find out for themselves. He therefore advised the finder to cut off the leaf carefully without disturbing the bead-like mass and to keep it in the School Museum for some days, in order to see what would happen. The joy of the boys was almost unbounded when, after 6 days, they discovered that from the small round objects which formed the cluster very tiny worm-like objects had come out and were feeding on the castor leaf. The boys were in this way encouraged to find out for themselves the life histories of moths, butterflies and other insects. By observing living

and interesting things which changed from day to day, their intelligence was developed, and their interest in the mysteries of Nature roused.

Their training in cultivating their plots in the school garden gave the boys manual skill and quickness of eye. Many of them became quite expert in handling tools and on holidays could be found helping their parents in weeding, harvesting and other farm work.

The school garden also helped to brighten school surroundings and to give the boys some idea of neatness, order, and beauty. The boys were sometimes asked to make a line drawing showing the division of the garden and its different plots, and to find out the yield and profit per *bigha* and acre therefrom. The system of village land tenure was also explained to them in a practical way and they were taught the use of all the different village records. The boys got their ideas from real objects which were familiar to them. These objects were nearly all connected with agriculture which was to be their work in life on leaving school.

In order to foster the reading habit, the teacher encouraged them to read the books of the well-kept school library. The reading habit acquired in this way stuck to most of the boys throughout life and helped to keep those who took up farming, in touch with the improved agricultural methods practised in other countries. Another habit learned at school which became a valuable quality in manhood was that of being punctual in business, and honest in dealing with their fellow-men.

Education, moreover, created in their minds, in after years, a feeling of dissatisfaction with their present lot, and led many of them to learn and strive for a higher standard of life and comfort. For help and guidance they often came to Rai Sahib Kaluram who continued to be their

friend and adviser. Through his personal efforts and fin example he did much, as we shall learn later, to help ther and inspire them to help themselves.

CHAPTER 8.

Towards the end of the year 1918 a strange diseas called Influenza or Spanish fever broke out in the Distric Being very infectious it spread rapidly from village to villag causing thousands of deaths; while many of those wh recovered were so reduced in strength that they were unabl to harvest their kharif or sow their rabi crops in time.

Rai Sahib Kaluram had read an account of this diseas and had also consulted the Civil Surgeon as to the bes method of preventing it from spreading in Petgaon. Th Civil Surgeon explained to him that the disease was highl infectious and that the bacillus which caused it was to b found in millions in the breath of a person affected wit it. The contagion was, he said, carried from one to anothe through the air. It spread very rapidly among people livin in crowded and badly ventilated houses, because of th large quantity of foul air which such houses contained.

He was told that if the disease broke out the perso attacked should be segregated at once; and should be give an airy room, hut or tent to live in. Light food such a *sujji* and plenty of good milk should be given to the patien in order to keep up his strength. If carefully nursed an protected against chills, he recovered in about 10 days a a rule; if neglected the disease was apt to develop int pneumonia and cause death. The Civil Surgeon also explaine that there were different medicines for the different stage of the disease.

When the disease broke out in Petgaon, Rai Sahib Kaluram by segregating those affected as advised by the Civil Surgeon, prevented it from spreading. Very few were attacked and no deaths occurred. He himself visited all the sick, gave them the medicines prescribed by the Civil Surgeon, and saw that they were properly nursed.

To prevent his catching the infection himself he was advised to gargle his throat after visiting the sick in their rooms. This gargle consisted of water in which 2 or 3 small crystals of permanganate of potash had been dissolved giving it a reddish colour. The Civil Surgeon had explained to him that permanganate killed the disease-bearing germs which collected in one's throat when breathing in the foul air of a sick-room.

He was able to do good work in the adjoining villages in advising the people to take steps to guard themselves against catching the disease, and in helping to nurse those who were attacked. In this noble work he was assisted by several workers from Petgaon who paid daily visits to the houses of the sick and saw that they were properly nursed. Temporary dispensaries were started in neighbouring villages, and medicines were supplied free of cost to all who were affected with the disease. He attached much importance to the use of these medicines prescribed by the Civil Surgeon, but often used to tell his patients that the best medicines were fresh air and light nourishing foods like milk and *sujji*, and that these should be provided at frequent intervals to those suffering from the disease.

CHAPTER 9.

"Disease and death are the children of darkness and dirt; health and long life are the children of light and cleanliness."

Rai Sahib Kaluram Kurmi had, as a young man, made the acquaintance of the Civil Surgeon of the District, who had presented him with a book entitled *"Life, Light and Cleanliness."* He was also very friendly with the Sub-Assistant Surgeon of his village dispensary, and showed his interest in the dispensary in a practical way by giving of his means towards its upkeep, and by paying frequent visits to it. He did all in his power to better the health and welfare of his people, and he was beloved by them in return. Petgaon earned the name of being the cleanest village in the District; and it became a common saying that "Petgaon people never died except of old age."

With the advice of the Civil Surgeon he got the villagers to build roomy houses that were well-lit, dry, airy, and easy to clean. The floor of the court-yard of each house was one foot above the level of the street and remained dry even in the rainy season. On one side of the court-yard was an open built shed containing the earthen bins in which grain was stored. Rats could not get into this shed, as it had a stone floor and a plinth 3′ high, with a projecting ledge 9″ broad. By keeping these grain bins outside, the owner of the house got rid of rats which cause plague. At one end of the court-yard was a shed in which the cattle were kept at night. In many villages the custom was for the people to keep them in the rooms in which they lived; but this is a very bad custom as these animals render the air impure.

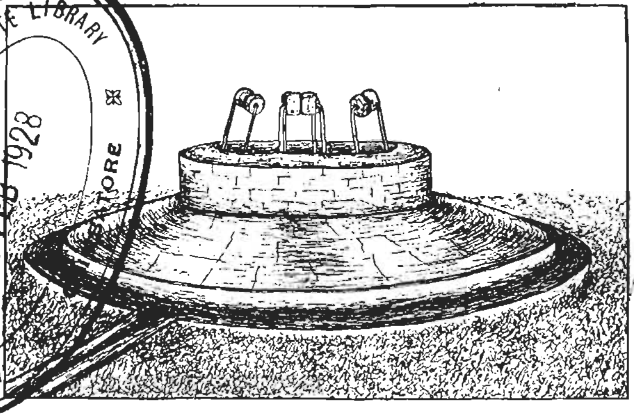
The floor of the room in which the people lived was

raised half a foot above the level of the court-yard and was therefore always dry and healthy even in times of flood. The room was large and very airy, because on one side was the door, while on each of the other three sides was a window placed just about the height of a man's head. In each window was fixed an iron lattice. The impure air breathed out by people sleeping in the room escaped by these windows and there was a continuous flow of fresh air coming in to take its place.

To keep the air of the village pure and sweet Kaluram Kurmi insisted on every house and every street of his village being swept daily, and on all dung and rubbish being removed to a distant place in the fields where it was covered with earth. In other villages the people built houses of a bad pattern which having no windows, were dark and stuffy. The people and cattle often slept in the same room in these houses and thus the air was very foul and unhealthy. Thousands of flies bred in the dung and filth of the court-yard and spread infection far and wide by carrying germs of cholera, dysentery, enteric and other diseases to the food which the people ate. In the book presented to him by the Civil Surgeon, Rai Sahib Kaluram had read that the female fly prefers to lay its heap of eggs on warm moist dung. From each of the eggs a tiny grub or maggot is hatched out which feeds on the dung. This grub soon bursts its skin and a fully grown fly emerges. By removing dung and rubbish to a distant field and covering it with earth flies find nothing to breed in, and their numbers in the village soon decrease very much.

He had also induced his people to subscribe money for the making of two good wells in a clean open part of the village where there was no filth of any kind. Of these wells the water always remained pure, because no dirt could get into

it. The wells were very strong being built of brick and mortar. Surrounding each well was a brick wall 2 feet high; and outside that again was a sloping platform which drained away water falling from the bucket into a small channel made for the purpose. Thus no filth or impurity of any kind could enter the well from the surface. Each well was supplied with its own bucket and rope for drawing water. No other vessel was allowed to be used for fear of introducing germs of disease into the water. Rai Sahib Kaluram had learned from the Civil Surgeon that many of the worst diseases common in villages are caused by drinking water containing the germs or seeds of these diseases.



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A good well.

Before these wells were made the people used to get their drinking water from the village tank where dirty buffaloes wallowed all day, and where people bathed and washed their clothes. No wonder that in those days the villagers were sorely afflicted with that terrible disease cholera which is caused by myriads of small germs which get into

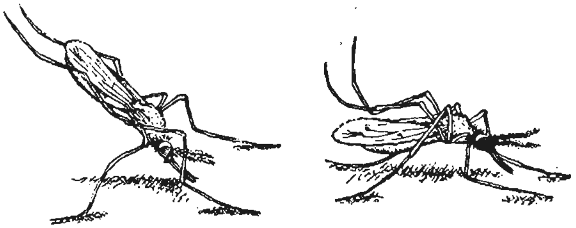
the body through drinking water. These germs are so small that the eye cannot see them; but when they get into the bowels of a man they cause severe diarrhœa. From his bowels they pass into his veins and arteries and soon eat up all the strength of his blood, thereby causing death in a few hours. A man suffering from cholera vomits and passes a milky fluid which contains the germs or seeds of the disease. When a drop of this milky fluid gets into a well those germs or seeds multiply many hundred-fold, and any person drinking that water cannot escape getting cholera.

Rai Sahib Kaluram had been told by the Civil Surgeon that cholera germs are readily killed by permanganate of potash and that water infected with such germs can be made quite harmless by adding to it a few grains of this chemical. Whenever cholera broke out in the neighbourhood of his village he always treated his wells with permanganate of potash, as a safeguard against this terrible scourge. He also warned the people at such times to cook their food in clean vessels, to prevent flies, the carriers of disease, from getting into it after it had been cooked, and not to drink milk or water unless it had been boiled.

Petgaon was always clean; the water supply was good, and flies never became a serious pest in the village. Cases of opthalmia, diarrhœa, dysentery, guinea-worm, enteric and cholera were almost unknown; because the causes of these diseases did not exist in the village. The people no longer believed that all diseases were due to fate, and that a man could do nothing to save himself from sickness. They realised by experience the meaning of these words: "Disease and death are the children of darkness and dirt; health and long life are the children of light and cleanliness."

CHAPTER 10.

Kaluram once got the Sub-Assistant Surgeon to give a short lecture in the village school on malaria. He told them in the course of his lecture that malaria had been known and described by learned men a very long time ago. These learned men had observed that people, living in wet climates where there was much vegetation, suffered greatly from fever. They therefore thought that this fever, or ague as they called it, was caused by breathing in the poisonous gases which the swampy ground gave off. In 1880, however, a very learned Frenchman discovered that in the blood of a person suffering from this kind of fever there was always to be found a



THE MOSQUITO.
DANGEROUS. HARMLESS.

peculiar kind of germ which he said was the cause of malaria or ague. He could not tell, however, how it got into the blood. Some years later a great man, Major Ronald Ross by name, when working in India proved that this germ was injected into the blood of men by a kind of mosquito called the "anopheles." It is easy to tell the difference between this kind of mosquito and the harmless type, because the one sits like a fly, while the other seems almost to stand on its head.

Major Ronald Ross and other European physicians were also able to show that the mosquito gets the germs of malaria

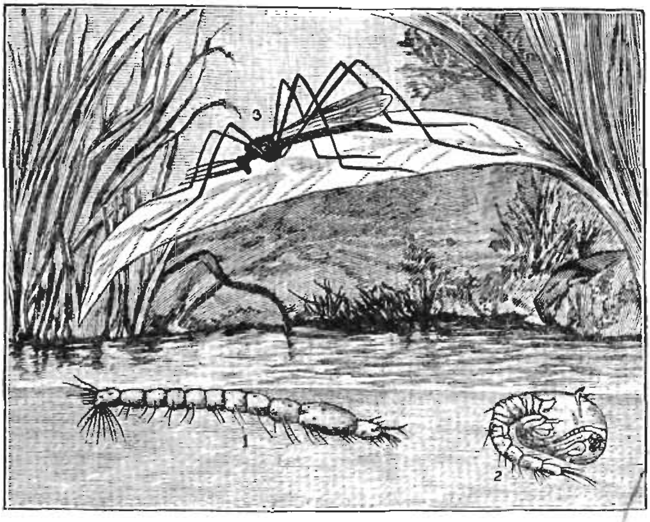
into its body when it bites a person who has malarial fever. These germs multiply very fast in the mosquito's body, and when the mosquito bites another person they get into his blood, where they multiply many thousand-fold in a very short time. This brings on an attack of malarial fever, just as cholera germs bring on an attack of cholera. Quinine, when taken as a medicine by a man suffering from malaria, passes from his stomach into his blood, and kills any germs of malaria that may be there. When a man has been taking quinine for sometime before he is bitten by the mosquito, the germs of malaria are thus poisoned by the quinine already present in the blood, and he does not get malaria. Quinine is therefore not only a cure for malaria, but is also a preventive if taken regularly throughout the malarial season.

These doctors found that the mosquito which causes malaria breeds by laying its eggs in stagnant water, and that as the egg of the silk-worm changes into a caterpillar and the caterpillar into a moth, so the egg of the mosquito changes into a little creature like a worm, and lastly into a fly.

When the eggs are hatched, the young mosquitoes, which now look like tiny worms, swim about in the water; but unlike fish they cannot breathe under water, and have therefore to keep coming up to the surface to breathe, just as a frog does. If we prevent them from coming to the surface they die for want of air. This we can do by pouring a little kerosene oil on the water. The kerosene forms a film of oil on the water and through this film of oil the young mosquito cannot pass. It is therefore drowned just as a man is drowned when his head is kept under water.

Quinine is made from the bark of a tree called the Cinchona tree which is a native of Peru in South America, where the people suffer much from this kind of fever. It had been known from very ancient times in that country that

a person could be cured of malaria by eating the bark of this wonderful tree. Her Most Gracious Majesty, Queen Victoria Empress of India, ordered that young Cinchona trees should be brought from Peru and planted on the hills in parts of India where the climate is like that of Peru. This was done and bark of these trees is now collected every year. The quinine is extracted at Government expense and is supplied at so cheap a rate that even the poorest can afford to buy it.



(1) Larva ; (2) Pupa ; (3) Perfect Insect.
Life history of the mosquito.

Rai Sahib Kaluram being a man of a very practical turn of mind determined to do all in his power to save his village people from this dreadful malady. He drained off water from swampy ground in the village. To pools which coulu not be drained he added a little kerosene once a week to kill the young mosquitoes breeding there. He and all his

family used mosquito nets on their beds as a further precaution and as an example to others. He insisted on every person in the village taking quinine regularly in the malarial season. All these measures he adopted because prevention was, he said, better than cure.

He found it very difficult at first to get some of the older people to take quinine as they believed that it would make them weak. He was able to prove that this is not true; because in England where there is no malaria doctors give quinine as a tonic to strengthen people who are suffering from ill-health. He was also able to prove to them that the young men in his village who had been taking quinine for years were strong and healthy. He never failed to impress on his people that malaria like other ailments is due to definite causes, and that when the cause of a disease is known, it is the duty of a man to save himself from it.

In bygone days the people of Petgaon like those of other villages in the District had suffered much from malaria. Many had died of it, and others had been weakened at the busy season of the year to such an extent that they were unable to till their fields properly. But thanks to the assistance of the Civil Surgeon and to the efforts of Kaluram, times had changed for the better. The people of Petgaon were now a strong contented sturdy race of good cultivators.

CHAPTER 11.

Small-pox was another disease which had in olden times caused many deaths not only in Petgaon but in every village in the District. Scarcely a person escaped an attack at some time or other during his life. Of those who recovered many were weakened and disfigured and in some cases blinded for i fe. For this scourge, too, a preventive had been found

many years ago. In Europe *vaccination* has stamped out small-pox almost entirely. The Civil Surgeon of Nermad was accustomed to send trained men to vaccinate the children of every village against small-pox. In Petgaon Kaluram used his influence in getting the parents to bring their children for vaccination on these occasions.

Kaluram had on one occasion visited Baratra where he saw the Vaccine Institute where lymph for vaccination was being prepared by vaccinating buffalo calves and taking lymph from their skins. He was shown how all the instruments and tubes used for making and storing it were cleansed and purified by heat. The Superintendent of the Institute also showed him a picture of that remarkable English physician, Jenner, who by the discovery of vaccination had conferred such a boon on the human race.

Vaccination causes small-pox in a very mild and harmless form. One seldom has small-pox more than once, and to have been vaccinated is as good a preventive as to have had small-pox. That is to say it gives practically the same safety or "immunity" as the Doctors say. As this immunity lasts only for six or seven years re-vaccination should be done at the end of that time.

The more he learned about these diseases which carried off so many valuable lives every year in Indian towns and villages, the more he was impressed by that saying, "Disease and death are the children of darkness and dirt; health and long life are the children of light and cleanliness."

CHAPTER 12.

Plague is another disease which has taken many lives in India. It had been known from very ancient times that plague was a disease connected in some way with rats. The Egyptians are said to have regarded the cat as a sacred animal because it killed rats, and so helped them in checking plague. The Egyptians, however, did not know how this disease was carried by rats.

It was discovered later that plague like malaria, cholera and some other diseases, is caused by very small germs or seeds which get into the blood. It was found that in every tiny drop of blood taken from the body of a rat suffering from plague, there were many thousands of these plague germs. These germs are carried from the diseased rats to healthy ones by rat-fleas, in the same way as malaria is carried from one person to another by a particular kind of mosquito. Rat-fleas feed on the rat by sucking its blood. When a flea which has sucked the blood of a plague rat afterwards sucks the blood of a healthy one, it gives that healthy rat plague. Plague is thus carried from rat to rat by rat-fleas.

Plague is carried from rats to human beings in the same way. A rat suffering from plague comes out of its hole to die. When it dies its body and blood get cold, and the fleas being unable to suck its blood go elsewhere in search of food. They jump on to another rat, bite him and give him plague in turn. This goes on till all the rats in the house die of plague. When there are no rats left to feed on, these rat-fleas get on to the legs and bodies of people and give them plague in the same way. Plague may be carried from house to house and village to village in this way, by

rats which are suffering from the disease. It may also be carried by people on whose clothes there are fleas which have come from diseased rats.

People can save themselves from plague by killing off all the rats. If there were no rats there would be no rat-fleas to carry plague germs. When plague has broken out in a village people from that village should not be allowed to enter other villages, where there is no plague, for fear of bringing plague fleas with them.

As soon as plague begins to spread in a village the people should leave their houses and live in the fields for safety. If they do not they are likely to be bitten by fleas from rats which have died of plague. They should not return to their houses for at least ten days. Before occupying any house again they should kill any fleas there may be in it, by closing all the doors and windows, and burning about a seer of sulphur on the floor. All clothes, vessels and boxes should be taken outside and exposed to the direct rays of the sun.

As soon as rats begin to die of plague in a village the people should at once get inoculated. A person who has been inoculated is not likely to catch plague, and if he does catch it he has a much better chance of getting over it. Rai Sahib Kaluram Kurmi was always the first man in his village to get inoculated when plague broke out. His good example enabled the Sub-Assistant Surgeon to get nearly all the people of the village done. Rai Sahib Kaluram thoroughly believed that when the cause of a disease was known the cure was always possible ; but he laid great stress too, on the importance of prevention in diseases of this kind, which he said were due to carelessness. For rats and fleas, like flies, are vermin and should be destroyed. Though it may be difficult for poor people with *kutcha* houses to get rid of

fleas, it is at least possible for them to get rid of rats. If there were no rats there would be no rat-fleas. " Prevention is better than cure " was ever his motto.

To interest his people in the importance of destroying rats in the village, Kaluram used to tell them the story of the wise Raja who got rid of plague in his kingdom by killing the rats therein. This wise Raja's kingdom had been sorely afflicted year after year with plague in the days when plague inoculation was not known. He determined to kill off all the rats, and held a large gathering of his people to explain the object he had in view. He showed them one hundred rats which he had had captured and then placed each in a separate trap. He also showed them one hundred pearls of great price which would be theirs if they captured these hundred rats. The rats were taken out, one by one, from their cages and a small slit, big enough to hold a pearl, was cut in the loose skin of the belly of each. In each slit a pearl was sewn up very carefully and the rats were put back into their cages again. Next day in the presence of his people these 100 rats were set free in the villages. Rat-catching soon became a favourite pastime with the people of that kingdom. Many poor people spent their whole time catching rats. Cultivators, clerks, teachers and others devised new ways and means of killing them. He, who was fortunate enough in killing a rat containing a pearl, gained a great fortune for the pearl was of great price. In a very few months lakhs of rats had been caught and killed. When plague broke out later in that country very few cases occurred in the kingdom of this wise Raja ; for plague is a disease carried by rat-fleas, and when there are no rats there are no rat-fleas. By this clever device the Raja thus saved the lives of many of his people.

CHAPTER 13.

We have already said that germs, or micro-organisms as they are sometimes called, are very tiny living things which cause some of the very worst kinds of illness. Nearly 80 out of every 100 deaths in India are caused by diseases due to germs. The germs of some diseases are so small that 25,000 of them placed side by side would measure only an inch.

Germs can multiply with enormous rapidity when the conditions are favourable. There are many different kinds of germs: some produce disease and death; others cause the rotting of the dead bodies of plants and animals, and others cause milk to go sour. They vary in shape too. Some are round, some are rod-shaped, and some are spiral in form.

DIFFERENT FORMS OF BACTERIA.
1. COCCI. 2. RODS. 3. COMMAS. 4. SPIRILLA.

A disease due to germs can be prevented by removing the cause. When the towns and villages of Europe were filthy, Europeans used to die in large numbers of plague, small-pox and enteric; but when people there began to obey the laws of health by attending to cleanliness and preventive measures, these diseases almost disappeared.

Many kinds of germs live and multiply in rotting things such as rotten fruits, dead animals and human

excreta. Many of the worst kinds of disease-germs thrive in water and milk ; but they can be killed by boiling for five minutes. This is a very cheap and simple way of destroying them, and clothes and linen as well can be readily disinfected in this way. Food should be cooked before it is eaten as a rule, and water and milk boiled before they are drunk, in order to kill any dangerous germs they may contain.

Another easy way of killing germs is to expose them to direct sunlight. Clothes and bedding should be spread out in the sun, and we should get as much sun into our houses as possible.

The germs of deadly diseases are often spread by flies. Flies are the dirtiest of all vermin, and perhaps the most dangerous. Their dirty habits lead them to feed on human excreta, rotting vegetable matter, diseased corpses and other filth. When they leave these to sit on our food, as they sometimes do, they carry with them tiny particles which often contain disease-germs. A fly may come straight from a cholera corpse and fall into your tea. It may rest on your food after having gorged itself on the excreta of a man suffering from enteric. Indeed, enteric fever is spread almost entirely in this way. Flies should be kept out of the house as far as possible by removing the filth that attracts them. Those that do get in should be killed by the use of poison and different kinds of fly traps. They should be kept out of food by covering it. No dung or filth of any kind, in which flies breed, should be allowed to be near a dwelling house.

It has already been pointed out that when cholera broke out in the neighbourhood, Rai Sahib Kaluram Kurmi always treated the two wells in his village with permanganate of

potash which is a deadly poison to cholera germs. He first dissolved some of this chemical in a bucket of water and then emptied it into the well. About one quarter of a seer of permanganate was enough, he found, to give a slight reddish colour to the water. This he was told was the strength required to kill any disease germs there may be in the water.

Rai Sahib Kaluram was never tired of preaching the importance of cleanliness to his villagers, and of their taking precautions to prevent diseases from breaking out. When cases of cholera, diarrhœa, dysentery and enteric did occur in his village he insisted on the excreta and vomiting of the persons attacked being burned; for he believed that disease germs were living things which had to be destroyed in one way or another.

He had noticed that in India some of the worst diseases were caused by the pollution of wells, and he therefore paid great attention to the water supply in his village. No one was allowed to wash clothes, or to leave any dead rotting filthy matter near either of the two village wells, and no one was permitted to use any vessel for drawing water except the bucket provided for the well. To him cleanliness was next to godliness.

To show how deadly an enemy the fly was to man, Rai Sahib Kaluram used to tell his village people the story of a very clever physician who lived in a city in the East. This great physician once offered a prize of Rs.1,000 to any citizen who would tell him what one living thing was man's greatest enemy. Their guesses were many and varied. Many guessed the tiger and the serpent; but no one thought of the fly, which, as the physician said, is really our deadliest foe; for while the tiger may kill thousands of human beings every year, the fly causes the death of hundreds of thousands.

CHAPTER 14.

Rai Sahib Kaluram had long desired to visit his brother Kisan who had purchased a village in Tezpore District in the Attisgarh Division. He decided to go there early in November after completing the sowing of his wheat in Petgaon. November proved a very suitable time for a visit to this part of the Provinces, because most of the kharif crops including rice were still standing, and the Annual Show and Conference of the Division was being held on the Tezpore Experimental Farm about the middle of that month.

The cultivators of Attisgarh were much more backward than those of the cotton and juar tract in which Rai Sahib Kaluram lived. This was partly due to the fact that the climate being wetter, the people suffered more from malaria during the rainy season and early cold weather. Their cultivation was very careless and slovenly. Large areas were lying fallow some of which were infested with *kans*, a weed which defied the agricultural implements of the tract, for the cattle here were small and weak, and were able to draw only small implements which were not suitable for good and deep cultivation.

The scattered nature of their holdings was also a great handicap to good cultivation. The different plots belonging to one cultivator were often far apart. Much valuable time was spent by him in bringing his implements and labour from one plot to another. It was often difficult to irrigate these plots, as the water had sometimes to be brought through the fields of other cultivators who objected to water courses being made in their fields. In the absence of fencing it was almost impossible to grow crops on such lands in the hot weather when the village cattle were allowed to graze over

the whole village area. The cost of fencing so many small fields would, of course, have been prohibitive.

In Nermad and other Districts of his own Division the annual rainfall ranged from 27 to 40 inches and the chief crops grown were cotton, juar and wheat; while in this Division the rainfall was well over 50 inches and the principal crops grown were *rice*, *kodo* and *kutki*.

Several large irrigation canals and tanks had been constructed by Government with a view to supplying irrigation for rice mainly; but the people were such poor cultivators that very few of them could be induced to irrigate this crop, or to grow others which required irrigation.

There were large areas of porous sandy loam in this tract which, being well drained and aerated, were admirably suited for irrigated crops. There were also some heavy clayey soils similar to the black cotton soil of Petgaon.

Rice, *kodo* and *kutki* were the chief crops; but wheat, tur and til were also grown. *Kodo* was sown on the more gravelly soils, wheat, rice, tur and til on black soil, and early rice and *kutki* on the lighter sandy loams. On the alluvial soils found near rivers sugar-cane, vegetables and some fruits were grown.

Rai Sahib Kaluram was so impressed by what he saw in this Division that he decided to buy the village of Amdi which was for sale at that time. Amdi was only 25 miles from Tendula, the village which his brother Kisan had purchased 10 years previously. Both villages were commanded by an irrigation canal which Government had just completed.

Kisan was not a very enterprising farmer. When his brother explained to him what he intended to do in Amdi in the way of growing new crops, Kisan laughed at him. The soil of Attisgarh was, he said, so poor that it ate up all one's

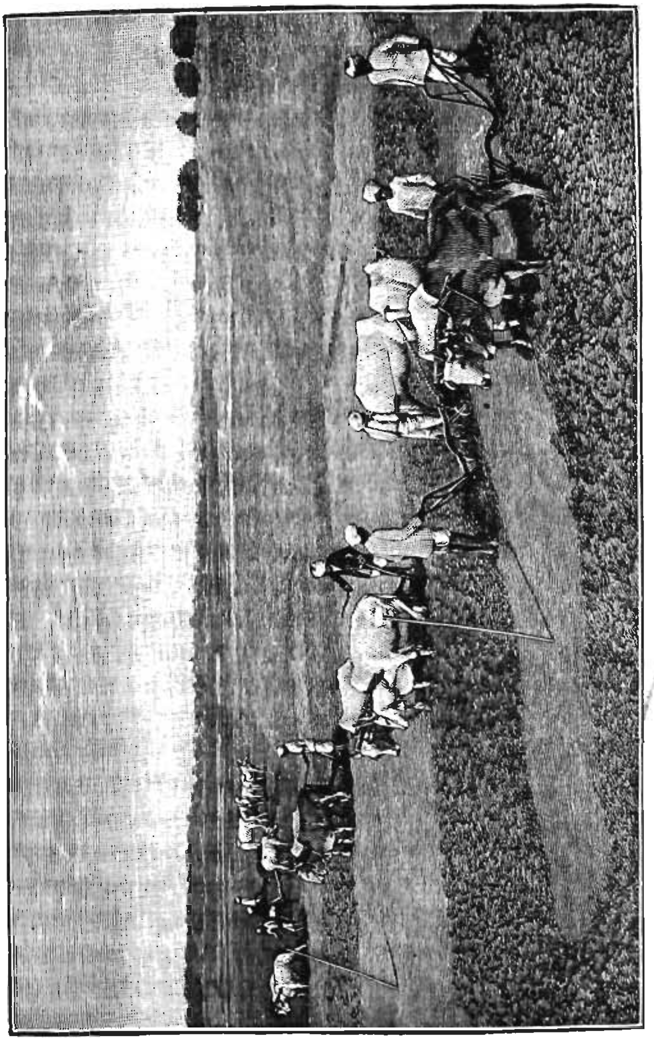
money and gave little in return ; but needless to say Kaluram knew better, for he had seen for himself how badly the land was cultivated, and drew his own conclusions as to why the crops were poor.

After inspecting the numerous fine samples of different grains, sugar-cane, cotton and groundnut exhibited at the Agricultural Show and Conference held on the Tezpore Farm, Rai Sahib Kaluram was more convinced than ever that he could, in a few years, make a small fortune by adopting improved methods of cultivation in Amdi village. This he had now definitely made up his mind to do, though his brother Kisan still continued to tell him that he would come to grief sooner or later.

The Department of Agriculture had already made good progress in developing agriculture in this Division and thousands of good samples of rice, wheat, groundnut, cane and cotton were exhibited at the Show by the cultivators. They had obtained seed of improved varieties of these crops from Seed Farms run by Government, or by land-owners who had got their seed originally from the Tezpore Farm.

CHAPTER 15.

Rai Sahib Kaluram was most interested in what he saw on the Tezpore Farm at the time of his visit. Over two thousand cultivators from different parts of the Division attended the Agricultural Show that year. Many of them brought exhibits of crops raised from selected strains of seed obtained by them from Government or private seed farms. He was surprised to find at this show exhibits of fine samples of new varieties of sugar-cane and groundnut, and of long-stapled cottons, of which he had never even heard the names



A ploughing competition testing different ploughs.

before. One variety of cotton, namely Cambodia, was, he learned, being grown with the help of irrigation on shallow gravelly red soil known in that Division as *bhata*. Most of the cane and groundnut exhibited had been grown on this same class of soil. Another interesting feature of this Show was a ploughing competition in which all the different kinds of ploughs under trial in this tract were shown at work.

The bigger ploughs such as the Turnwrest and the "Sabul" were clearly too heavy for the puny bullocks of this part of the country. The small *deshi* plough, on the other hand, was so light that it merely scratched the surface soil. It neither inverted the soil nor did it uproot or cut the weeds.

The M. S. N. or Meston plough, as it is generally called had proved to be very suitable for this tract. Like the Turnwrest and Sabul it was an improved plough which inverted the furrow and cut the weeds ; but it was so light in draught that it could be drawn by a pair of very small local bullocks.

There were several different types of iron cane mills at work on the Show ground and near these an old wooden *deshi* mill was worked to show the advantages to be gained by using improved iron mills. The improved mill being light in weight was worked by one pair of bullocks, while for the *deshi* mills two pairs were needed. It was found, moreover, by an experiment carried out in the presence of the cultivators who attended the show that day, that, while the *deshi* mill gave 55 seers of juice for every 100 seers of cane, the iron mills gave 66 seers. Rai Sahib Kaluram had used one of these mills costing Rs. 120 for two years in Petgaon, and he reckoned that, by doing so, his extra profits had far more than covered the cost of the mill.

A new kind of furnace for gur-making had also been

prepared for demonstrating purposes at this Show. It had a draught chamber underneath the fire-place, and for the quantity of fuel used gave much more heat than the local type. For this improved furnace no fuel, other than the trash and *megass* of the cane itself, was required ; while for the old *deshi* furnace 10 cart loads of wood were needed for every acre of cane crushed.

Another interesting feature of this Show was the large number of cattle exhibited both by land-owners and small cultivators. To Rai Sahib Kaluram these cattle seemed very small, as compared with those of the cotton tract, where owing to the grazing area being very small, they were largely stall-fed on *karbi* and cotton seed.

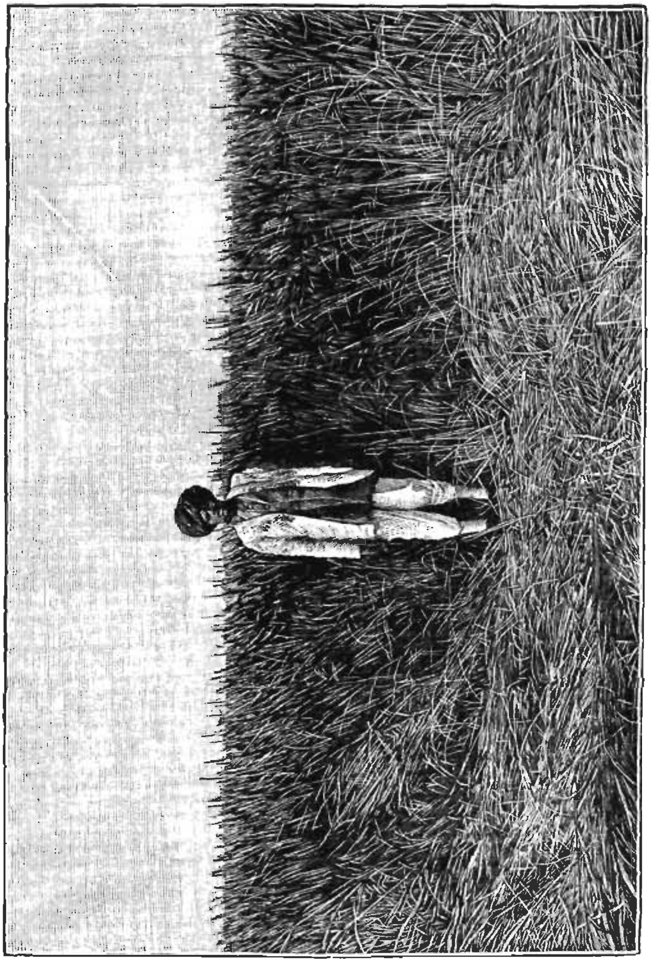
In Attisgarh cattle were, he found, fed mainly on rice straw which is a very poor fodder. The plough bullocks were thin and weak, and the standard of cultivation low in consequence. He ascertained from one of the local Malguzars, however, that as a result of the efforts of the Department of Agriculture in supplying good bulls and in getting cattle-owners to grow good fodder crops and to keep their best cows and bulls for breeding, some progress in improved stock-breeding had already been made. He also learned that the quality of the animals sent to this Annual Show was getting better every year, and that their owners were now beginning to show real interest in this branch of husbandry.

CHAPTER 16.

One portion of the Tezpore Farm was entirely reserved for experiments, while all the remainder of the area was being used for the production of improved strains of seed. The lessons learned from the experimental area were being applied to the portion reserved for seed-growing. The rice

Levelling before transplanting rice.

grown in part of this area was being manured with *san* hemp which had been proved to be a most useful green-manure for this crop. The *san* hemp was grown on the rabi area of the farm, and was applied to the rice-fields at the rate of about 100 maunds per acre, just before transplanting them.



Transplanted rice on Tezpore Farm.

All this rice area was transplanted, because it had been found by experiment that transplanted rice gave about one-third more produce than when broadcasted. For transplanting the seed rate required was only about 15 seers per acre, while for broadcasting from 40 to 50 seers were used. It had been found, that by transplanting, wild rice was, in a year or two, killed out. In fields where rice is broadcasted year after year this wild rice becomes a very serious weed and reduces the outturn, as most of the wild rice sheds its grain before being harvested. The presence of grains of wild rice in rice of a good variety, moreover, reduces the value of the sample.

The Superintendent had sown a small nursery plot with rice five weeks before the Show, in order to demonstrate to the people on the spot how transplanting should be done. Water to a depth of about 3 inches was, on the day of the Show, run into the nursery in order to moisten the soil thoroughly. The seedlings were then pulled up without injuring the roots and tied together in small bunches before being carried from the nursery to the plot to be transplanted. To the latter plot also water had been applied and it was being ploughed and stirred with a toothed implement in order to form a liquid mud in which to plant out the seedlings. This is what is known as "puddling" the soil. At the time of puddling, the plot was carefully levelled, because a level plot is easily irrigated.

The women who were planting out the seedlings worked in a line. They had become so skilled in the process as the result of long experience that one woman could transplant an acre in ten days.

The seedlings of the nursery or seed-bed were stout and strong. The Superintendent explained that this was due to the fact that a low seed-rate had been used. He had sown

the nursery at the rate of 300 lbs. per acre. The custom of the country was to sow about 1000 lbs. But when so much seed is used, the seedlings are weak and do not do so well as stronger ones when transplanted.

Puddling the soil before transplanting rice.

Other lessons learned from the experiments being carried out on this Farm were that strong seedlings, planted singly, gave as good a yield as weaker seedlings planted in bunches; that seedlings transplanted singly do best when planted out at the age of from 4 to 6 weeks, and at the distance of 4 inches apart on poor land, 6 inches apart on land of medium fertility, and 9 inches apart on good land.

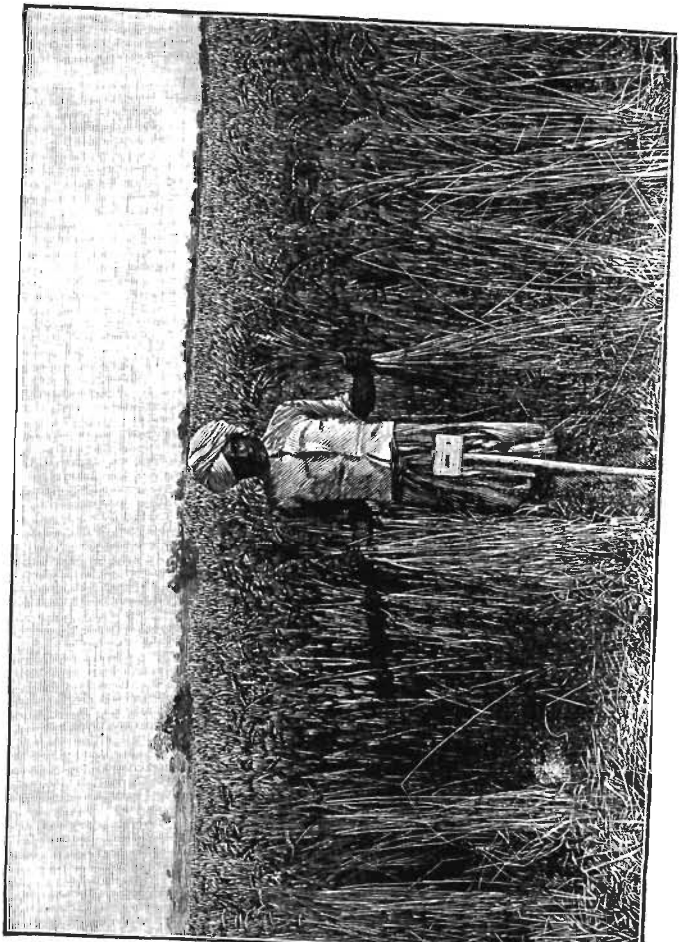
From a trial of numerous early and late varieties of rice on the Farm three or four heavy-yielding varieties of each had been singled out for distribution to cultivators. These were being improved by seed selection. Rai Sahib Kaluram was surprised to learn that the best of the latter varieties

when irrigated yielded about 300 seers more of paddy than the best of the early varieties.

In another part of the Farm the Superintendent showed him hundreds of tiny plots of rice each of which had been sown with the seed from a selected ear. The outturn of each plot would, he learned, be weighed in order to find out what ear or strain was most productive. Large areas of rice had been sown with pure strains of seed which had been selected in this way. This seed was being propagated for distribution to land-owners who multiplied it by growing it on Seed Farms in their own villages. They, in turn, sold the seed raised by them to cultivators for sowing. Selected strains of seed were widely distributed in a very few years by following this system of production and distribution.

The big fields of these selected paddies with their heavy ears of golden grain dropping from sheer weight delighted Rai Sahib Kaluram. He fully realised that to be able to increase the yields of the fruits of the Earth in this way, by patient work extending over several years, was one of the great feats of Science. Before leaving the Farm he ordered seed of these improved rices and wheats, as he had made up his mind to start a Seed Farm in Amdi, so as to be able to supply his tenants with seeds of these superior varieties.

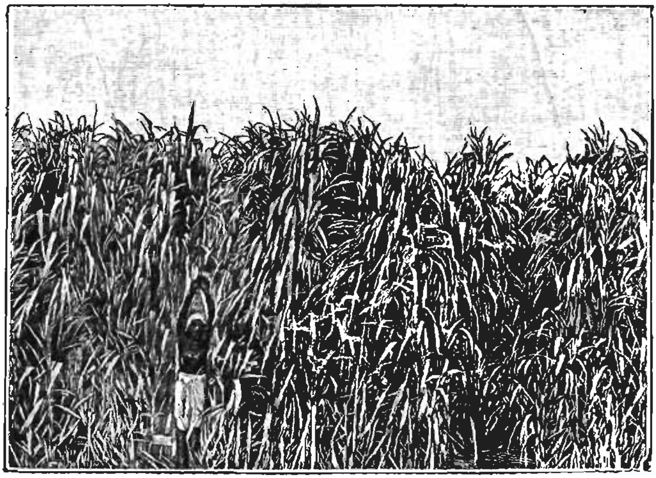
Other experiments were being carried out with wheat and large fields of selected varieties were being grown for seed. He was particularly interested in a fine crop of Pusa 12 an awnless variety which did well, he was told, both as an irrigated and as a dry crop.



Field of Pusa 12 wheat.

CHAPTER 17.

It had been a surprise to Rai Sahib Kaluram to learn that many of the samples of crops, which were exhibited at the Tezpore Show, had been grown on the thin red soil which the cultivators of these parts regarded as being too poor for any crop but *kodo*. He decided to visit the Chaurai Seed Demonstration and Cattle-breeding Farm where crops were, he was told, being grown on coarse gravelly soil of this type



Sugar-cane grown on gravelly soil on the Chaurai Farm.

In the afternoon of the second day of the Show the officers of the Department of Agriculture arranged to bring visitors out to this farm which was only nine miles distant. Rai Sahib Kaluram was one of those who had the pleasure of being shown round that day, and to him it was a real pleasure. On his return he told his brother Kisan that when

he saw such beautiful crops of cane, groundnut, cotton and juar growing on the gravelly soil of this Farm he could not at first, believe his own eyes.

Kisan was so interested in his brother's account of what he had seen that he, too, must needs pay a visit to Chaurai the day after the Show and Conference. He like his brother was quite astounded by what he saw, and confessed to the Superintendent before leaving the Farm that, till now, he had not thought it possible to raise such bumper crops on thin gravelly soil. He had, he said, never grown any crop but *kodo* on such soil ; though there was a large area of *bhata* in his village.

What pleased him most was a beautiful crop of cane standing over 12 feet high. Many different varieties were under trial. Of these some had soft rinds and were therefore more liable to be damaged by pigs and jackals and by a disease called 'red rot.' Others had hard rinds and were less subject to damage from these causes. These canes differed in thickness too ; some were nearly as thick as his wrist, while others were no thicker than his thumb. They also varied in colour. Some were red, some green, some striped, and some were of a dark ashy colour.

In Petgaon Rai Sahib Kaluram had been accustomed to grow two varieties only, namely a thick green variety which he called '*Pounda*' and a thin variety called *Katai*. He learned from the Superintendent that some of the varieties, which he now saw for the first time, had been compared with *Pounda*, *Katai* and other local canes and had proved to be much superior to them. Ashy Mauritius, Khari, Uba and a Java cane, known as J 247, were the best varieties under trial.

Many different kinds of cotton were also being grown. The Superintendent showed him that the staple *i.e.* length

of fibre, of some of the exotic varieties, was over an inch in length, while that of the indigenous or *deshi* cotton varied from one-half to three quarters of an inch. The original home of most of the exotic cottons under trial on the Farm was America, where the climate is suitable for varieties which take a long time to mature. The rainy season in India was, he learned, too short for them; but they did very well on light soils when irrigated, because irrigation prolonged the growing period.

In one field these exotic cottons had already shed most of their leaves. This, he was told, was due to their not having been irrigated. In an adjoining field where they had been irrigated, they were in a most flourishing condition and were covered with bolls.

The cultivators of the neighbourhood had learned a useful lesson from this Farm, for though they had never before tried cotton, they were, with the help of irrigation, now growing on their light soils a large area of Cambodia, one of the best of the long-stapled exotic varieties.

The soil being naturally well-drained and well-aerated enabled the myriads of small soil bacteria to build up plant food therein. Water passed through such soils very quickly, and allowed the air which is so necessary for the healthy growth of the soil bacteria to enter.

All this interested Rai Sahib Kaluram very much. He now understood why it was that cotton which, on stiff black soil, suffered so much when the rainfall was heavy, stood any amount of rain when grown on *bhata* soil which was very porous. He also fully realised the value of irrigation which enables cultivators to grow long stapled varieties on these poor but well-drained soils.

CHAPTER 18.

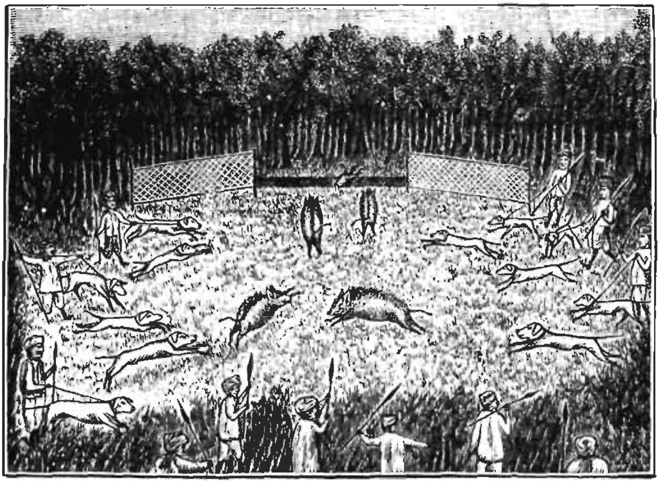
Rai Sahib Kaluram had, in his younger days, been fond of *shikar*. He had on one occasion shot a tiger which had in the neighbourhood of Petgaon carried off many village cattle. Several black buck and wild pig had also fallen victims to his gun. Black buck did much damage in this part of the country, more especially to rabi crops. But pigs were more destructive than all the other animals put together. To destroy them pig-killing clubs had been started in the District and a reward of four annas was given by Government for every pig killed.

Rai Sahib Kaluram and other members of the Tahsil Agricultural Association took an active part in starting these clubs and in arranging for 'beats' in jungly areas and grassy nullahs, where pigs were known to lie up in large numbers during the day. These clubs employed as *shikaries* men of the *Gond* and *Dhimar* caste who in this part of the country were known as keen hunters. In certain villages these men kept large packs of dogs trained in pig-killing.

A day or two before starting a 'beat,' the *shikaries* employed by the club used to survey the ground where the pig lay up during the day. They then proceeded to dig two or three deep trenches across the route which they knew they would take when driven from their lairs. These trenches they lightly covered with sticks and grass. In a line with the pits they set up nets, so as to catch any stray "*grunters*" which might run round the ends of the pits. To help to drive them into these, dogs were kept on leash on both sides.

As soon as a pig was seen the dogs were let loose

and at once pursued it. If, as generally happened, it fell into a pit, it was speared by the men; but if by chance it avoided the pits and ran into the net the dogs savagely attacked it.



A beat for pig.

Pigs would sometimes avoid both pits and nets and make a bee-line for the nearest jungle in search of cover. Even then they did not always escape, as the dogs being well trained and full of pluck often rounded them up in the open, and by vigorously attacking them from behind, wearied them out in time and finally worried them to death.

The club employed a *shikari*, who had a gun license and who devoted all his time to pig-killing. He shot them at night when they came to the sugar-cane fields, and

searched for them by day in the nullahs and jungles where they lay up. So successful were these Pig-killing Clubs that in one year some of them destroyed hundreds of pigs and thereby greatly reduced the amount of damage done to standing crops.

In the cold weather these same Clubs netted *hiran*, too, which at that season came in large numbers from the hills to graze in the fields of young wheat and gram.

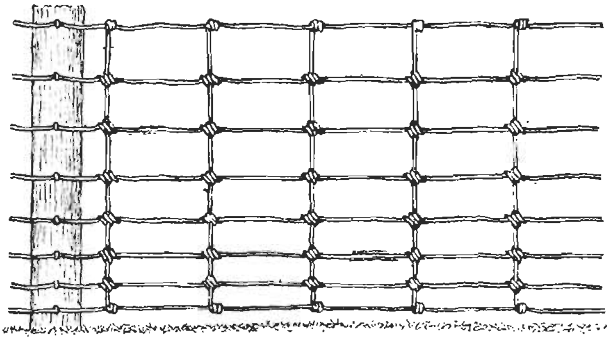
Some of the Clubs also helped to organise arrangements for the capture of the herds of wild cattle. One such herd had taken up its abode in the jungle near Petgaon and paid nightly visits to villages in the neighbourhood. This Rai Sahib Kaluram had captured in a kheddah as described later in this chapter.

He was always ready to try improved methods of doing things. He had done much to organise Pig-killing Clubs throughout his District, and thousands of these destructive animals had been accounted for within a year or two. But the crops still continued to be damaged for it was not possible to kill off all the pigs, hiran and other four-footed foes of the farmer. He was delighted therefore when he visited the Chaurai Farm to find that its crops grown thereon were protected from damage by wild animals by a new type of meshed wire fence known as 'Pig-proof Fencing.' This debarred not only pigs but larger quadrupeds from getting into the crops.

Rai Sahib Kaluram fenced all his sugar-cane, groundnut and garden crops, both in Petgaon and Amdi, that same year with Pig-proof Fencing, and no damage whatever was done to his crop. Many Malguzars in the neighbourhood of these villages followed his example the following year and the demand for Pig-proof Fencing became so great that the Tahsil Agricultural Association began to stock it for

sale. This kind of fence has since become very popular in tracts where cane and other valuable crops are damaged by pigs and other animals.

Rai Sahib Kaluram's fame spread abroad and he was frequently asked to assist other land-holders in devising ways and means of protecting crops from wild animals.

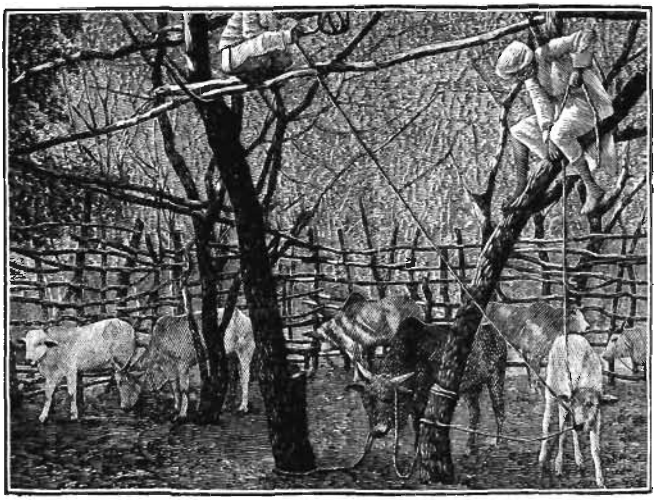


Pig-proof fencing.

In villages adjoining the more jungly portion of the Tahsil there were herds of wild cattle which in the dry season, when grass was not plentiful, ate up, or otherwise destroyed much of the wheat crop. He devised the following method of capturing them. He fenced in an area of about 200 square yards near the place where they lived during the day, so as to form a strong Kheddah. As an entrance to this enclosure he had a gate-way provided with a swing gate worked by means of a rope. To get animals to enter the Kheddah, some good fodder such as hay and juar stalks were placed inside, and a trail of the same fodder with a handful of cotton seed and salt was placed at short intervals outside, so as to entice them to the entrance. As soon as they entered the man in charge of the gate pulled

his rope and the animals were impounded. Needless to say the man who worked at the gate had to conceal himself in a small pit dug for the purpose; because if the animals saw or heard him they suspected danger and galloped off at once.

These wild cattle like most other denizens of the jungle fed at night and rested during day. They could be captured in this way therefore only at night. The Kheddah had to be



Capturing wild cattle.

strong and sound; otherwise they broke through by charging it in a body. To stop the force of such a charge, it was found necessary to dig a trench about 5′ wide and 3′ deep all round the inside of the fence.

When a herd had been shut up in this way the fun began in the morning when the work of tying them to trees was taken in hand. The picture above shows how this was done.

Many cattle were caught in the neighbourhood of Petgaon by this clever device, and several of them were tamed and trained to do useful work. The villagers concerned were most grateful to Rai Sahib Kaluram for showing them how to capture and use these destructive animals many of which can be seen working quietly in the yoke at the present day. They are now usefully employed by their captors in raising wheat, juar and other food-crops which, in former days, they used to destroy.

CHAPTER 19.

Rai Sahib Kaluram was a firm believer in the advantages of irrigation, especially when the water came from a river and carried with it fine silt rich in plant food. He decided therefore to induce all his tenants to irrigate their rice and wheat, and to cultivate other irrigated crops in the waste area of the village which had long lain fallow.

No attempt had been made up to this time to connect Amdi village with the irrigation canal which Government had constructed, because the cultivators of the village were not willing to bear the cost of making the necessary water-courses. He got them to agree to do so in the end and as they were not able to bear all the cost of this work at that time, they borrowed the money from Government which had set apart a certain sum to be given as *takavi* loans for this purpose.

The first thing he taught his tenants in Amdi was to obey the irrigation rules which had been drawn up for the good of all. He urged them to be ready to spread the water quickly over their fields when their turn came, and to avoid wilful or careless waste of water. He had no sympathy with

those who tried to cheat by taking water for fields for which they did not intend to pay the water rate. Any deception of this kind roused him to anger.

Rai Sahib Kaluram's thirst for knowledge was so great that he decided to visit the Punjab and to see for himself what progress had been made there in introducing the cultivation of irrigated crops. He got letters of introduction to various officials and big land-holders in these Provinces and started off for that Province in November.

In the Punjab he found that the principal crops grown were wheat and cotton which, when irrigated, gave very large yields per acre. Another thing which interested him very much was a contrivance known as a Module which measured the quantity of water given to each cultivator.

The villages were divided into large blocks or *chaks* of about 25 acres each. Every block had its own system of water channels so that every bit of it could be irrigated with ease. Rai Sahib Kaluram was delighted to see how beautifully all the land was laid out in large blocks. In Attisgarh he had learned by experience how difficult it was to produce good irrigated crops on account of the scattered nature of the holdings. When he returned to Amdi one of the very first things he did was to call a meeting of his tenants and to get them to agree to a re-arrangement of their holdings so that each could have all his land in one *chak* or block. His tenants being very conservative he found it very difficult at first to get them to follow his advice. Knowing as they did, however, that he was a very good practical farmer and that he was kind and anxious to help them, they finally agreed to do what he told them.

When Kisan visited his brother about two years later he found to his surprise that the lands of Amdi had been laid out, in *chaks* or blocks, that some of these blocks had been

fenced, and that a good approach road had been made to the village. He found, too, that the fields which had previously suffered from scouring had been provided with low earthen bunds to hold up the silt, and that behind these bunds were drains which carried off the surplus water during the rains. All the village cattle dung was being carefully conserved for manure, and wood instead of cattle dung was being used for fuel.

Various other improvements had been carried out, but what surprised him most of all was the fine crops which were being grown on the coarse gravelly soil which he had always considered too poor for cultivation.

Kisan being still doubtful as to whether it would pay to spend so much money, as his brother and his tenants had done, in effecting these improvements, Rai Sahib Kaluram showed him his balance sheet for the previous year which proved that he had made a net profit of over Rs. 100 per acre. Kisan's own net profit from the cultivation of the same class of soil had, he confessed, never exceeded Rs. 3 to 4 per acre. He now saw that he had not been enterprising enough in his village. He had made no improvement because he was satisfied with old and unprofitable methods of farming. The result was that he and his tenants had made very little money.

People of neighbouring villages were so surprised to see the large outturns obtained by Rai Sahib Kaluram from what they considered very poor land that they accused him of enticing away their crops by sorcery. When he came to know this, he had all his servants, improved implements, sleek draught bullocks and samples of manures brought together near the centre of his irrigated land. He then invited his suspicious neighbours to come and see for themselves by what magic he raised such bumper crops. When they had all

assembled he turned to them and said, "These my friends, are the instruments of magic which I use" and he pointed at the same time to the bubbling irrigation channel, to the samples of oil-cake and other manures in front of him, to his strong draught cattle and to the men who handled them, to the luscious fodder crops on which they were fed, to his improved implements and well-cultivated and well-drained fields, to his selected heavy-yielding strains of rice, wheat and other crops carefully spaced in the fields in which they were growing, to his legumes which he said enriched the soil for the crops which followed them, and to his well-kept farm accounts which accurately showed the profit which he derived from every field.

Amdi became a model village in many respects, and was frequently visited by Government Officers as well as cultivators of neighbouring villages. It served the purpose of being a most useful demonstration centre for the whole neighbourhood; for Rai Sahib Kaluram was able to prove conclusively to his fellow cultivators that the improved methods which he practised in his village had added greatly to the wealth of the villagers. They had as a result of this raised their standard of living; and were more contented than ever before. They became more enterprising, too, and began to see how foolish it was to cling to old methods when all the world around was advancing.

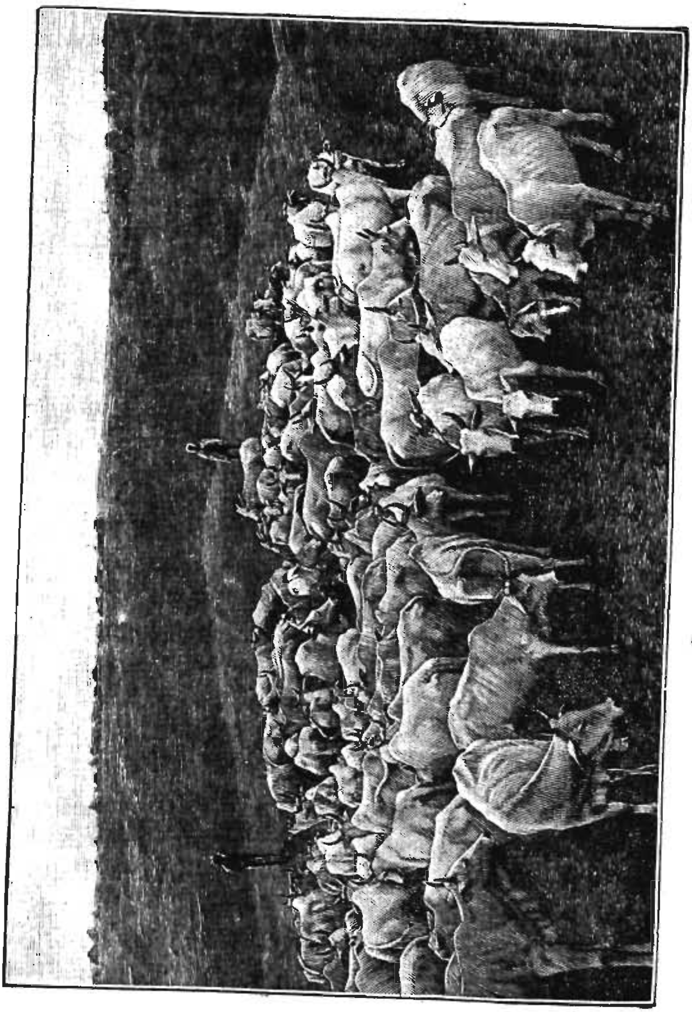
What pleased Rai Sahib Kaluram most of all when he visited the Chaurai Farm was the big crops growing on poor soil and the fine herd of cattle that were being reared on the fodder crops grown thereon.

The ordinary village cattle of Attisgarh Division were badly bred and badly fed. In size they were so small that they were too weak to draw anything but the lightest of implements. The standard of cultivation was therefore very low and the outturns of the staple crops poor in consequence.

The herd of this Farm consisted of 60 cows, one bull and about 60 young animals. The bull and cows had been carefully selected from large herds in the better grazing tracts of the Division. Being well fed with Egyptian clover, juar, and other fodders, as well as with oil-cakes, these cattle were in excellent condition ; while the puny cattle of neighbouring villages were thin and weak ; for their owners had not yet learnt to appreciate the value of good draught animals. No attempt was yet being made by them to improve their herds by better feeding and better breeding. To stimulate an interest in this branch of husbandry Government had started Co-operative Cattle-breeding Societies. Each Society had a farm on which the members kept their selected cows. Government supplied the Farm with a good stud bull, and advised the Society as to how to rear their stock. The members paid all the working expenses, including grazing fees and cost of fodder and concentrated food-stuffs fed to the cattle. The animals belonging to each member were branded and their numbers entered in the Stock Register. The owner was allowed to remove his young stock to his own village whenever he pleased.

The Cattle Show held every year on the Tezpore Farm by the Department of Agriculture in connection with the Divisional Show and Conference had helped to rouse the interest of the bigger landowners in the improvement of their herds to some extent. A large number of cattle were exhibited and competition for prizes had become very keen.

In the year in which Rai Sahib Kaluram paid his first visit to the Tezpore Show, Kisan, though not yet a very enterprising farmer at that time, won the silver cup offered for the best group of 12 cows, and one bull exhibited at the Show. Of this he was very proud as the cup was



Cattle on the Chaurai Farm.

presented to him by the Commissioner and his brother Kaluram was there to see him get it. He and other big land-holders had begun to see that it paid to breed good cattle, because without them it was impossible to till the land properly. They had also found that by using only the very best animals for breeding, and by feeding them well, a big improvement in the quality their stock could be brought about in a few years.

Rai Sahib Kaluram had, once upon a time, visited the Atpore Government Dairy Farm where he found that the breed of milch buffaloes and cows kept thereon had been greatly improved by rearing only the calves of the best milkers. He was told by the man in charge that to rear a poor milker cost as much as to rear a good one, as they both consumed about the same amount of food. Some cows and buffaloes on that Farm did not give enough milk to pay for their keep, he was told; while others paid for their keep and gave a big profit besides.

Being a keen observer as well as a man of great intelligence he learned much as the result of his visits to these Farms. He never failed to put the lessons which he learnt into practice in his own village whenever he could possibly do so. He purchased two fine bulls from the Chaurai Farm the following year which he kept for his own use and that of his tenants in Amdi village.

He also sowed five acres of juar and clover for his cattle with seed supplied by the Superintendent of the Chaurai Farm. By feeding these green fodders to his herd in the hot weather he kept them in good condition; while the herds of adjoining villages which had to depend solely on grazing became very thin and weak and many of them died in the beginning of the rains.

CHAPTER 20.

Before leaving Attisgarh Rai Sahib Kaluram expressed a desire to the Deputy Director of Agriculture to be taken round some of the villages in the tract commanded by canal irrigation. He wanted to see for himself what progress was being made in getting the people to take up agricultural improvements. The Deputy Director gladly consented and they toured together for several days.

Though the people of this tract were considered to be very backward many of them were now transplanting large areas of rice and carrying out other improved methods which were quite new to them. These new methods had first been tried by a few of the more enterprising land-owners on their own lands. Other Malguzars as well as cultivators, followed their example later, when they saw that the new methods were to add to their farming profits.

To show them how to carry these new and more profitable ways of doing things, the Department of Agriculture had put a trained agriculturist, of the ploughman type, in charge of small groups of 4 or 5 villages. These men who were called *Kamdars*, showed the cultivators how to carry out the improvements which were being introduced.

To supervise the work of these *Kamdars* there were trained Agricultural Assistants each of whom was in charge of the demonstration work in from 25 to 30 villages. The work of both *Kamdars* and Agricultural Assistants was supervised by a Divisional Superintendent of Agriculture who had been promoted from the ranks of the Subordinate Agricultural Service. Working in co-operation with these Government officials were several of the leading members of the Tahsil Agricultural Associations.

Rai Sahib Kaluram learned that all this so-called demonstration work which was being carried out so successfully was based on the results obtained on the Experimental Farms. When a new method of cultivation, or a new variety of seed was found to be profitable, the Department of Agriculture at once brought it to the notice of the cultivators by getting the more go-ahead land-owners to demonstrate it in their villages. He also found that many of these land-owners were members of the Tahsil Agricultural Associations, and that some of these Associations were stocking improved seed and implements for sale, with a view to encouraging cultivators to try them.

This very practical system of helping the cultivators to help themselves pleased Rai Sahib Kaluram very much; for the improved methods of cultivation were being carried out by the cultivators themselves who used their own bullocks, their own implements and their own land.

The land-owners and the more intelligent ryots were very grateful for all that Government was doing for them. Several of the Malguzars had shown their gratitude by presenting Silver Cups and Medals to be given to cultivators for good work. These cups and medals were presented every year at the time of the Divisional Agricultural Conference.

CHAPTER 21.

At the time of his visit to the Chaurai Farm, Rai Sahib Kaluram was delighted to find that, attached thereto, was an Agricultural School for training boys in improved methods of Agriculture. The course, which was a two years' one, aimed mainly at training boys to use their hands and eyes. They were taught how to handle tools and imple-

ments with skill, and how to draw correct conclusions from what they saw.

Each boy had half an acre of land given him which he himself cultivated. Some of these lads had learned so quickly that at the end of two years they could handle all the improved implements used on the Farm, as skilfully as the Farm ploughmen. They became most interested, too, in all their teachers had to tell them about plants, soils, manures and cattle. The progress which these boys were making at this school impressed Rai Sahib Kaluram so favourably that he decided to send his son Jaganath there next year.

Jaganath was 14 years of age at this time. He had just completed his education at the Petgaon Upper Primary School. He was a clever well-behaved lad, and big and strong for his years. Like his father he was a born agriculturist, and during holidays liked to help his "Bap."

Jaganath was brought by his father to the Chaurai Agricultural Middle School the following June. The motto over the front door of one of the Class-rooms was one which greatly appealed to them both. It ran as follows :—

"Perfect agriculture is the true foundation of trade and industry : It is the foundation of the riches of States."

That motto seemed to convey to Jaganath a true sense of the dignity and importance of the farmer's work He was proud that he was a farmer's son, and that he himself was to be a farmer. Being an apt pupil he had by the end of the first year learned to handle all the farm implements, and had raised on his own plot of land bumper crops of sugar-cane, rice, groundnut and juar. He had learned something of the theory of Agriculture, also, and of the sciences allied thereto.

After completing the two years' course at this school Jaganath settled down in Amdi, his father's village, where in after years he earned for himself the name of being the best farmer of that District. At the Petgaon primary School and the Chaurai Agricultural School he had got the kind of education which fitted him for the business of life. He had learned by doing things for "skill to do comes from doing; knowledge comes by eyes always open and working hands: and there is no knowledge that is not power."

Other village boys of his age who had not the advantage of this practical education took no interest in farming and acquired habits of laziness, indolence and indifference. They never became good cultivators, because they had taken no interest in practical cultivation when they were young. Their book-learning was of little use to them in after years. It actually gave them a distaste for practical work.

Some years later the Chaurai Agricultural School was raised to the status of an Agricultural High School and an Agricultural Reader was published for the use of the boys. Jaganath was delighted to find that it contained the lessons which had stimulated his interest in Nature and in Practical Agriculture, when he himself had been a student at the Chaurai Agricultural Middle School.

When his father got a copy of this Reader he was so pleased with it, and so grateful for all the school had done for his boy Jaganath that he decided to use part of his savings, in providing his countrymen with free copies of it. To the Commissioner of Attisgarh Division he gave that year a cheque for Rs. 1,000 which was to be spent in publishing copies to be given free of cost to literate cultivators in his Province.

CHAPTER 22.

In this story I have given an account of this great and good man Rai Sahib Kaluram; while in a separate Reader will be found the lessons on Indian Agriculture which his son Jaganath prized so much. The example of Rai Sahib Kaluram is one which should encourage Indians, both old and young, to work for the good of their motherland, by doing what they can to raise the standard of Agriculture which is, and always will be, India's greatest industry. India's prosperity depends on India's Agriculture.

His earnest desire always was to raise the standard of comfort among his people. They were poor; they lacked ambition; they neglected the laws of health. By precept and example, by the interest which he showed in their welfare and by his generosity at all times he helped them to help themselves.

Within the last 12 years a great change has come over the cultivating classes of the Province. Thousands of farmers who used to cultivate their lands by the old rule of thumb methods, handed down to them by their forefathers, have adopted improved methods which have added largely to their farming profits. They have become better off and more ambitious; and many of them have built for themselves better and more sanitary houses. They now realise the value of education and educate their children in order to enable them to take full advantage of the wonderful results of Scientific Agriculture.

They now see that education pays in the long run, more especially that kind of practical education which fits their sons for their life's work as farmers, and which, while qualifying them to earn their bread, makes them self-reliant

and self-respecting. For the training given at these Agricultural Schools the demand has become so great, that the Director of Public Instruction has found it necessary to give instruction in the principles and practice of Agriculture at Middle Schools in every District. Each of these schools has now a small farm attached to it on which boys are trained in the best methods of Agriculture. The Chaurai and other Agricultural Schools opened on Government Farms have been converted into High Schools at which boys get a more advanced training in Agriculture. From these Agricultural High Schools boys are flocking in larger numbers every year to the Agricultural College where they are given a still more advanced course, and where they are trained in methods of research. These young men are giving of their best to the motherland: some of those who have completed their training are now engaged in helping to solve by experiment and research the manifold problems of Agriculture in India.

For this new way of looking at things and this demand for agricultural education we owe much to Rai Sahib Kaluram Kurmi and men such as he who, by example and precept, are doing much to develop agriculture in this country. They are setting the standard of progress for the whole farming community. By adopting improved methods they have attained results in the field which are of the very greatest value as object lessons to their neighbours. Practical object lessons of this kind appeal to the most illiterate.

GLOSSARY.

Bap—Father.

Dhimar—A caste whose chief occupation is fishing.

Deshi—Belonging to India.

Dub or *hariali* (Cynodon dactylon)—A good grass for pasture lands but an obnoxious weed in cultivated fields.

Gin—A machine for separating cotton lint from the seed.

Gond—One of the most important non-Aryan tribes found in the jungly tracts.

Juar, juari or *cholam*—Is one of the larger millets.

Kamdar—A superior ploughman.

Kans grass (Saccharum spontaneum)—A persistent weed in badly cultivated fields.

Kapas—The name applied to cotton as picked from the boll : the lint is separated from the seed by means of a gin.

Karbi—Dried juar stalk used as a fodder.

Kodo or *kodon* (Paspalum-scrobiculatum)—One of the minor millets grown on poor soils, the grain of which is an important article of food among the poorer classes.

Kunda—A coarse grass which on account of its spreading roots and hardiness is a most troublesome weed in some badly-cultivated fields.

Kutki (Panicum miliari)—One of the minor millets.

Lint—The fibre attached to cotton seed.

Malguzar—A land-owner who may own part of a village. a whole village or several villages.

Megass—The refuse of cane stalks left after extracting the juice.

Rai Sahib -An honorary title granted by Government to worthy Hindus.

Sanad—A certificate of merit.

Sarkari—Belonging to Government.

Seer—A seer is equal to 80 tolas or 2 lbs. approximately.

Smut—A fungoid disease common to juar and other cereals.

Sujji—A kind of meal made from wheat.

Taccavi—A loan given by Government to landholders.

Tahsil—For Administrative purposes districts are divided up into tahsils with a Tahsildar in charge of each.

Tola—One-fortieth of a pound.

Winnower—A machine for separating the grain from the chaff of cereals.